# CHAPTER 2

# LEGAL ASPECTS

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# 2.1 Overview

## 2.1.1 Introduction

Various drainage laws and rules applicable to highway facilities are discussed in this chapter. The intention is only to provide information and guidance on the engineer's role in the legal aspects of highway drainage. This chapter should not in any way be treated as a manual upon which to base legal advice or make legal decisions. It is also not a summary of all existing drainage laws, and most emphatically, this chapter is not intended as a substitute for legal counsel.

The following generalizations can be made in reaching the proper conclusion regarding liability:

- A goal in highway drainage design should be to perpetuate natural drainage, insofar as practicable.
- The courts look with disfavor upon infliction of injury or damage that could reasonably have been avoided by a prudent designer, even where some alteration in flow is legally permissible.
- The laws relating to the liability of government entities are undergoing radical change, with a trend toward increased government liability.

## 2.1.2 Order Of Law Supremacy

The descending order to law supremacy is Federal, State, and local, and, except as provided for in the statutes or constitution of the higher level of government, the superior level is not bound by laws, rules, or regulations of a lower level. State permit requirements are an example of law supremacy. Federal agencies do not secure permits issued by State agencies, except as required by Federal law. Many laws of one level of government are passed for the purpose of enabling that level to comply with or implement provisions of laws of the next higher level. In some instances, however, a lower level of government may promulgate a law, rule or regulation which would require an unreasonable or even illegal action by a higher level. An example is a local ordinance which would require an expenditure of State funds for a purpose not intended in the appropriation. Many such conflicts in the laws of different levels of government involve constitutional interpretation and must be determined case by case.

## 2.1.3 ADOT Responsibility

ADOT is generally treated like a private party in drainage matters. The undertaking of a public improvement is liable like an individual for damage resulting from negligence or an omission of duty. As a general rule, ADOT is under no legal duty to construct drainage improvements unless highway improvements necessitate drainage — as in those situations in which street grading and paving or construction increase or alter storm runoff.

ADOT can be held liable for negligent construction of drainage improvements, for negligent maintenance and repair of drainage improvements and if it fails to provide a proper outlet for drainage improvements. Liability will attach where ADOT:

- collects surface water and casts it in a body onto private property where it did not formerly flow;
- diverts, by means of artificial drains, surface water from the course it would otherwise have taken, and casts it in a body large enough to do substantial injury on private land, where, but for the artificial storm drain, it would not go; and
- fills up, dams back, or otherwise diverts a stream of running water so that it overflows its banks and flows on the land of another.

# 2.1 Overview (continued)

## 2.1.3 ADOT Responsibility (continued)

### Design Guidance

Drainage matters range from the simple to the complicated. If the facts are ascertained and a plan developed before initiating a proposed improvement, the likelihood of an injury to a landowner is remote and ADOT should be able to undertake such improvements relatively assured of no legal complications.

If the designer needs guidance on a particular drainage problem or improvement, the request for guidance should describe as a minimum:

- the watercourse under study,
- what are the problems involved, and what causes them (obstructions, topography, development - present and future),
- the proposed improvements that will make the situation better,
- how the proposal requires that the natural drainage be modified,
- what is the potential liability for doing something versus doing nothing,
- who will benefit from the proposed improvements, and
- in general, how what is proposed is "reasonable."

# 2.2 Federal Laws

## 2.2.1 Introduction

Federal law does not deal with drainage per se, but many laws have implications which affect drainage design. These include laws concerning:

- flood insurance and construction in flood hazard areas,
- navigation and construction in navigable waters,
- water pollution control,
- environmental protection,
- protection of fish and wildlife, and
- coastal zone management.

Federal agencies formulate and promulgate rules and regulations to implement these laws, and highway hydraulic engineers should attempt to keep informed regarding proposed and final regulations.

## 2.2.2 Constitutional Power

Federal law consists of the Constitution of the United States, Acts of Congress, regulations which government agencies issue to implement these acts, Executive Orders issued by the President, and case law. The Congress of the United States is granted constitutional power to regulate "commerce among the several states." A part of that power is the right to legislate on matters concerning the instrumentalities of interstate commerce such as navigable waters. The definition of navigable waters expands and contracts depending upon the breadth required to adequately carry out the Federal purpose. The result is that Congress can properly assert regulatory authority over at least some aspects of waterways that are not in themselves subject to navigation.

## 2.2 Federal Laws (continued)

### 2.2.3 Executive Orders

Presidential Executive Orders (E.O.) have the effect of law in the administration of programs by Federal agencies. While executive orders do not directly apply to State highway departments, these requirements are usually implemented through general regulations. Two Executive Orders that directly affect drainage are:

**Executive Order 11990, Protection of Wetlands, DOT Order 5660.1A, 23 CFR 777.**
Purpose - to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative.

**Executive Order 11988, Floodplain Management, as amended by Executive Order 12148, DOT Order 5650.2, FHPM 6-7-3-2, 23 CFR 650, Subpart A, 771**.
Purpose - to avoid the long- and short-term adverse impacts associated with the occupancy and modification of floodplains, and to restore and preserve the natural and beneficial values served by floodplains.

## 2.3 Federal Agencies

### 2.3.1 General

Basically four Federal agencies have the lead to carry out existing Federal regulations, other Federal agencies may have review and comment responsibilities regarding impacts of projects to the environment. When the designer becomes involved in obtaining approvals from the Federal agencies, he should be aware that these agencies do not always work in concert. Quite often they will not be in agreement with each other. This can result in significant project delays unless early coordination is initiated and diligently pursued. These conflicts between Federal agencies occur as a result of their having different rules; some are "regulators" while others are "resource" motivated. For this reason they will have different goals and, in some instances, definitions of such things as wetlands. When conflicts occur, it is best to quickly determine which agency has primary responsibility and attempt to address their needs.

### 2.3.2 Federal Highway Administration

Some of the more significant Federal laws affecting the Federal Highway Administration are listed below with a brief description of their subject area.

- *Department of Transportation Act (80 Stat. 941, 49 U.S.C. 1651 et seq.).* This Act established the Department of Transportation and set forth its powers, duties and responsibilities to establish, coordinate and maintain an effective administration of the transportation programs of the Federal Government.
- *Federal-Aid Highway Acts (23 U.S.C. 101 et seq.).* The Federal-Aid Highway Acts provide for the administration of the Federal-Aid Highway Program. Proposed Federal-Aid projects must be adequate to meet the existing and probable future traffic needs and conditions in a manner conducive to safety, durability and economy of maintenance, and must be designed and constructed according to standards best suited to accomplish these objectives and to conform to the needs of each locality.

## 2.3 Federal Agencies (continued)

### 2.3.2 Federal Highway Administration (continued)

- *Federal-Aid Highway Act of 1970 (84 Sta. 1717, 23, U.S.C. 109 (h)).* This act provided for the establishment of general guidelines to insure that possible adverse economic, social and environmental effects relating to any proposed Federal-aid project have been fully considered in developing the project. In compliance with the Act, the Federal Highway Administration issued process guidelines for the development of environmental action plans. These guidelines are contained in the Federal-Aid Highway Program Manual Volume 7, Chapter 7, Section 1 (FHPM 7-7-1), and in 23 CFR 795 et seq.
- *Federal-Aid Highway Act of 1966 (80 Stat. 766), amended by the Act of 1970 (84 Stat. 1713), 23 U.S.C. 109 (g).* This act required the issuance of guidelines for minimizing possible soil erosion from highway construction. In compliance with these requirements, the Federal Highway Administration issued guidelines which are applicable to all Federal-Aid highway projects. These guidelines are included in FHPM 6-7-1-1, 6-7-3-1, 6-7-3-2. Regulatory material is found in 23 CFR 650.201.

The Federal Highway Administration (FHWA) has been authorized to implement certain functions in the application of Federal regulations.

- Section 404 of the Clean Water Act - The Federal Highway Administration has the authority to implement the Section 404 Permit Program (Clean Water Act of 1977) for Federal-Aid highway projects processed under 23 CFR 771.115 (b) categorical exclusions. This authority was delegated to the Federal Highway Administration by the Corps of Engineers to reduce unnecessary Federal regulatory controls over activities adequately regulated by another agency. This permit is granted for projects where the activity, work or discharge is categorically excluded from environmental documentation because such activity does not have individual or cumulative significant effect on the human environment.

### 2.3.3 US Coast Guard

The Coast Guard (USCG) has regulatory authority under Section 9 of the Rivers and Harbors Act of 1899, 33 U.S.C. 401 (delegated through the Secretary of Transportation in accordance with 49 U.S.C. 1655 (g)) to approve plans and issue permits for bridges and causeways across navigable rivers. As outlined in 23 CFR 650 the area of jurisdiction of the USCG and FHWA is established as follows:

The FHWA has the responsibility under 23 U.S.C. 144(h) to determine that a USCG permit is not required. This determination shall be made at an early stage of project development so that any necessary coordination can be accomplished during environmental processing.

# 2.3 Federal Agencies (continued)

## 2.3.3 US Coast Guard (continued)

The USCG has the responsibility:
(1) to determine whether or not a USCG permit is required for the improvement or construction of a bridge over navigable waters except for the exemption exercised by FHWA as stated above, and

(2) to approve the bridge location, alignment and appropriate navigational clearances in all bridge permit applications.

For more information related to navigational clearances for bridges see the Federal-Aid Highway Program Manual 6-7-1-1.

## 2.3.4 US Corps of Engineers

The Corps of Engineers has regulatory authority over the construction of dams, dikes or other obstructions (which are not bridges and causeways) under Section 9 (33 U.S.C. 401). The Corps also has authority to regulate Section 10 of the River and Harbor Act of 1899 (33 U.S.C. 403) that prohibits the alteration or obstruction of any navigable waterway with the excavation or deposition of fill material in such waterway. Section 11 of the River and Harbor Act of 1899 (33 U.S.C. 404) authorizes the Secretary of the Army to establish harbor lines. Work channelward of those lines requires separate approval of the Secretary of the Army and work shoreward requires Section 10 permits.

Section 404 of the Clean Water Act (33 U.S.C. 1344) prohibits the unauthorized discharge of dredged or fill material into waters of the United States, including navigable waters. Such discharges require a permit. The term "discharges of fill material" means the addition of rock, sand, dirt, concrete or other material into the waters of the United States incidental to construction of any structure. The Corps of Engineers has granted Nationwide General Permit for twenty-six categories of certain minor activities involving discharge of fill material. Under the provisions of 33 CFR 330.5(a)(15), fill associated with construction of bridges across navigable waters of the United States, including cofferdams, abutments, foundation seals, piers, temporary construction and access fills are authorized under the Nationwide Section 404 Permit providing such fill has been permitted by the U. S. Coast Guard under Section 9 of the River and Harbor Act of 1899 as part of the bridge permit. Therefore, formal application of the Corps of Engineers for a Section 404 Permit is not required unless bridge approach embankment is located in a wetland area contiguous to said navigable stream. The Corps of Engineers has Section 404 regulatory authority over streams the Coast Guard has placed in the "advance approval" category. This category of navigable streams is defined as navigable in law but not actually navigated other than by logs, log rafts, rowboats, canoes and motorboats. Notably this regulation does not apply to the actual excavation or "dredging of material," provided this material is not reintroduced into any regulated waterway including the one from which it was removed.

The 1992 Energy and Water Development Appropriation Act provides guidance to use the 1987 Manual of the U.S. Army Corps of Engineers in the delineation of wetlands. This allows more flexibility in the definition and determination of wetlands.

## 2.3 Federal Agencies (continued)

### 2.3.4 US Corps of Engineers (continued)

Section 404 of the Clean Water Act (33 U.S.C. 1344) requires any applicant for a Federal permit for any activity that may affect the quality of waters of the United States to obtain water quality certification from the State certifying agency. In Arizona this is the Department of Environmental Quality (ADEQ).

### 2.3.5 US Environmental Protection Agency

The EPA is authorized to prohibit the use of any area as a disposal site when it is determined that the discharge of materials at the site will have an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas, wildlife, or recreational areas (Section 404 (c)), Clean Water Act (33 U.S.C. 1344).

EPA is authorized under the Section 402 of the Clean Water Act (33 U.S.C. 1344) to administer and issue a "National Pollutant Elimination Discharge System" (NPDES) permit for point source discharges, provided prescribed conditions are met.

- EPA or a state under the delegated authority issues NPDES individual or a general permit for storm water discharge associated with industrial activities involving any disturbance of five acres (approximately 2 ha) or more. Highway construction activities are classified as industrial activities.

### 2.3.6 US Fish and Wildlife Service

The Fish and Wildlife Act of 1956 (16 U.S.C. 742 et seq.), the Migratory Game-Fish Act (16 U.S.C. 760c-760g) and the Fish and Wildlife Coordination Act (16 U.S.C. 611-666c) express the concern of Congress with the quality of the aquatic environment as it affects the conservation, improvement and enjoyment of fish and wildlife resources. The Fish and Wildlife Coordination Act requires that "whenever the waters of any stream or body of water are proposed or authorized to be impounded, diverted, the channel deepened, or the stream or other body of water otherwise controlled or modified for any purpose whatever, including navigation and drainage, by any department or agency of the United States, or by any public or private agency under Federal permit or license, such department or agency shall first consult with the United States Fish and Wildlife Service, Department of the Interior, and with the head of the agency exercising administration over the wildlife resources of the particular state with a view to the conservation of wildlife resources by preventing loss of and damage to such resources as well as providing for the development and improvement thereof." The Fish and Wildlife Service's role in the permit review process is to review and comment on the effects of a proposal on fish and wildlife resources. It is the function of the regulatory agency (e.g., Corps of Engineers, U.S. Coast Guard) to consider and balance all factors, including anticipated benefits and costs in accordance with NEPA, in deciding whether to issue the permit (40 FR 55810, December 1, 1975).

# 2.4 Federal Emergency Management Agency (FEMA)

## 2.4.1 National Flood Insurance Program (NFIP)

The Flood Disaster Protection Act of 1973 (Pl 93-234, 87 Stat. 975) denies Federal financial assistance to flood prone communities that fail to qualify for flood insurance. The Act does require communities to adopt certain land use controls in order to qualify for flood insurance. These land use requirements could impose restrictions on the construction of highways in floodplains and floodways in communities that have qualified for flood insurance. A floodway, as used here and as used in connection with the National Flood Insurance Program, is that portion of the floodplain required to pass a flood that has a 1-percent chance of occurring in any 1-year period without cumulatively increasing the water surface elevation more than 1 ft.

## 2.4.2 NFIP Impact on Highways

The National Flood Insurance Act of 1968, as amended, (42 U.S.C. 4001-4127) requires that communities adopt adequate land use and control measures to qualify for insurance. Federal criteria promulgated to implement this provision contain the following requirements that can affect certain highways:

- In riverine situations, when the Administrator of the Federal Insurance Administration has identified the flood prone area, the community must require that, until a floodway has been designated, no use, including land fill, be permitted within the floodplain area having special flood hazards for which base flood elevations have been provided, unless it is demonstrated that the cumulative effect of the proposed use, when combined with all other existing and reasonably anticipated uses of a similar nature, will not increase the water surface elevation of the 100-year flood more than 1 ft at any point within the community.

- After the floodplain area having special flood hazards has been identified and the water surface elevation for the 100-year flood and floodway data have been provided, the community must designate a floodway which will convey the 100-year flood without increasing the water surface elevation of the flood more than 1 ft at any point and prohibit, within the designated floodway, fill, encroachments and new construction and substantial improvements of existing structures which would result in any increase in flood heights within the community during the occurrence of the 100-year flood discharge.

- The participating cities and/or counties agree to regulate new development in the designated floodplain and floodway through regulations adopted in a floodplain ordinance. The ordinance requires that development in the designated floodplain be consistent with the intent, standards and criteria set by the National Flood Insurance Program.

Additional information regarding the NFIP and the necessary actions regarding the construction of highways in floodplains and floodways in communities that have qualified for flood insurance is presented in Appendix 2B.

# 2.5 State Drainage Law

## 2.5.1 General

State drainage law is derived mainly from two sources: (1) common law and (2) statutory law.

- **Common law** is that body of principles which developed from immemorial usage and custom and which receives judicial recognition and sanction through repeated application. These principles were developed without legislative action and are embodied in the decisions of the courts.

- **Statutory law** is enacted by legislatures to enlarge, modify, clarify, or change the common law applicable to particular drainage conditions. This type of law is derived from constitutions, statutes, ordinances and codes.

In general, the common law rules of drainage predominate unless they have been enlarged or superseded by statutory law. In most instances where statutory provisions have been enacted, it is possible to determine the intent of the law. If, however, there is a lack of clarity in the statute, the point in question may have been litigated for clarification. In the absence of either clarity of the statute or litigation, a definitive statement of the law is not possible, although the factors that are likely to be controlling may be indicated.

## 2.5.2 Classification Of Waters

State drainage laws originating from common law, or court-made law, first classified the water that was being dealt with, after which the rule that was pertinent to the particular classification was applied to obtain a decision.

The first step in the evaluation of a drainage problem is to classify the water as surface water, stream water, floodwater, or groundwater. These terms are defined below. Once the classification has been established, the rule that applies to the particular class of water determines responsibilities with respect to disposition of the water.

- Surface Waters - Surface waters are those waters which have been precipitated on the land from the sky or forced to the surface in springs, and which have then spread over the surface of the ground without being collected into a definite body or channel.

- Stream Waters - Stream waters are former surface or ground waters which have entered and now flow in a well-defined natural watercourse, together with other waters reaching the stream by direct precipitation or rising from springs in the bed or banks of the watercourse. A watercourse in the legal sense refers to a definite channel with bed and banks within which water flows either continuously or intermittently.

- Flood Waters - Flood waters are former stream waters which have escaped from a watercourse (and its overflow channels) and flow or stand over adjoining lands. They remain floodwaters until they disappear from the surface by infiltration or evaporation, or return to a natural watercourse.

# 2.5 State Drainage Law (continued)

## 2.5.2 Classification Of Waters (continued)

- Ground Waters - In legal considerations, ground waters are divided into two classes, percolating waters and underground streams. The term "percolating waters" generally includes all waters which pass through the ground beneath the surface of the earth without a definite channel. The general rule is that all underground waters are presumed to be percolating and to take them out of the percolating class, the existence and course of a permanent channel must be clearly shown. Underground streams are waters passing through the ground beneath the surface in permanent, distinct, well-defined channels.

## 2.5.3 Disposition of Water

Two major rules have been developed by the courts regarding the disposition of surface waters. One is known as the civil law rule of natural drainage. The other is referred to as the common enemy doctrine. Modification of both rules has tended to bring them somewhat closer together, and in some cases the original rule has been replaced by a compromise rule known as the reasonable use rule.

Much of the law regarding stream waters is founded on a common law maxim that states "water runs and ought to run as it is by natural law accustomed to run." Thus, as a general rule, any interference with the flow of a natural watercourse to the injury or damage of another will result in liability. This may involve augmentation, obstruction and detention, or diversion of a stream. However, there are qualifications.

In common law, flood waters are treated as a "common enemy" of all people, lands and property attacked or threatened by them. In ground water law, the "English Rule," which is analogous to the common enemy rule in surface water law, is based on the doctrine of absolute ownership of water beneath the property by the landowner.

## 2.5.4 Civil Law - Surface Water

The civil law rule is based upon the perpetuation of natural drainage. The rule places a natural easement or servitude upon the lower land for the drainage of surface water in its natural course and the natural flow of the water cannot be obstructed by the servient owner to the detriment of the dominant owner. Most states following this rule have modified it so that the owner of upper lands has an easement over lower lands for drainage of surface waters and natural drainage conditions can be altered by an upper proprietor provided the water is not sent down in a manner or quantity to do more harm than formerly.

Under the common enemy doctrine, surface water is regarded as a common enemy which each property owner may fight off or control as he will or is able, either by retention, diversion, repulsion, or altered transmission. Thus, there is not cause of action even if some injury occurs causing damage. In most jurisdictions, this doctrine has been subject to a limitation that one must use his land so as not to unreasonably or unnecessarily damage the property of others.

## 2.5 State Drainage Law (continued)

### 2.5.4 Civil Law - Surface Water (continued)

Under the reasonable use rule, each property owner can legally make reasonable use of his land, even though the flow of surface waters is altered thereby and causes some harm to others. However, liability attaches when his harmful interference with the flow of surface water is "unreasonable." Whether a landowner's use is unreasonable is determined by a nuisance-type balancing test. The analysis involves several questions.

- Was there reasonable necessity for the actor to alter the drainage to make use of his land?
- Was the alteration done in a reasonable manner?
- Does the utility of the actor's conduct reasonably outweigh the gravity of harm to others?

### 2.5.5 Civil Law - Stream Waters

Where natural watercourses are unquestioned in fact and in permanence and stability, there is little difficulty in application of the rule. Highways cross channels on bridges or culverts, usually with some constriction of the width of the channel and obstruction by substructure within the channel, both causing backwater upstream and acceleration of flow downstream. The changes in regime must be so small as to be tolerable by adjoining owners, or there may be liability of any injuries or damages suffered.

Surface waters from highways are often discharged into the most convenient watercourse. The right is unquestioned if those waters were naturally tributary to the watercourse and unchallenged if the watercourse has adequate capacity. However, if all or part of the surface waters have been diverted from another watershed to a small watercourse, any lower owner may complain and recover for ensuing damage.

### 2.5.6 Civil Law - Flood Waters

Considering flood waters as a common enemy permits all affected landowners including owners of highways, to act in any reasonable way to protect themselves and their property from the common enemy. They may obstruct its flow from entering their land, backing or diverting water onto lands of another without penalty, by gravity or pumping, by diverting dikes or ditches, or by any other reasonable means.

Again, the test of "reasonableness" has frequently been applied, and liability can result where unnecessary damage is caused. Ordinarily, the highway designer should make provision for overflow in areas where it is foreseeable that it will occur. There is a definite risk of liability if such waters are impounded on an upper owner or, worse yet, are diverted into an area where they would not otherwise have gone. Merely to label waters as "flood waters" does not mean that they can be disregarded.

The "English Rule" has been modified by the "Reasonable Use Rule" which states in essence that each landowner is restricted to a reasonable exercise of his own right and a reasonable use of his property in view of the similar right of his neighbors.

# 2.5 State Drainage Law (continued)

## 2.5.6 Civil Law - Flood Waters (continued)

The key word is "reasonable." While this may be interpreted somewhat differently from case to case, it can generally be taken to mean that a landowner can utilize subsurface water on his property for the benefit of agriculture, manufacturing, irrigation, etc. pursuant to the reasonable development of his property although such action may interfere with the underground waters of neighboring proprietors. However, it does generally preclude the withdrawal of underground waters for distribution or sale for uses not connected with any beneficial ownership or enjoyment of the land from whence they were taken.

A further interpretation of "reasonable" in relation to highway construction would view the excavation of a deep "cut section" that intercepts or diverts underground water to the detriment of adjacent property owners as unreasonable. There are also cases where highway construction has permitted the introduction of surface contamination into subsurface waters and thus incurred liability for resulting damages.

# 2.6 Statutory Law

## 2.6.1 Introduction

The inadequacies of the common law or court-made laws of drainage led to a gradual enlargement and modification of the common law rules by legislative mandate. In the absence of statute, the common law rules adopted by State courts determine surface water drainage rights. If the common law rules have been enlarged or superseded by statutory law, the statute prevails. In general, statutes have been enacted that affect drainage in one way or another in the subject areas described below.

## 2.6.2 Eminent Domain

In the absence of an existing right, public agencies may acquire the right to discharge highway drainage across adjoining lands through the use of the right of eminent domain. Eminent domain is the power of public agencies to take private property for public use. It is important to remember, however, that whenever any property is taken under eminent domain, the State must show just cause and the private landowner must be compensated for his loss.

## 2.6.3 Water Rights

The water right which attaches to a watercourse is a right to the use of the flow, not ownership of the water itself. This is true under both the riparian doctrine and the appropriation doctrine. This right of use is a property right, entitled to protection to the same extent as other forms of property, and is regarded as real property. After the water has been diverted from the stream flow and reduced to possession, the water itself becomes the personal property of the riparian owner or the appropriator.

- Riparian Doctrine - Under the riparian doctrine, lands contiguous to watercourses have prior claim to waters of the stream solely by reason of location and regardless of the relative productive capacities of riparian and nonriparian lands.

# 2.5 State Drainage Law (continued)

## 2.6.3 Water Rights (continued)

- Doctrine of Prior Appropriation - The essence of this doctrine is the exclusive right to divert water from a source when the water supply naturally available is not sufficient for the needs of all those holding rights to its use. Such exclusive right depends upon the effective date of the appropriation, the first in time being the first in right.

Arizona generally operates under the Doctrine of Prior Appropriation. The important thing for highway designers to keep in mind in the matter of water rights is that proposed work in the vicinity of a stream should not impair either the quality or quantity of flow of any water rights to the stream.

# 2.7 Local Laws And Applications

## 2.7.1 Local Laws

Local governments (cities, counties, improvement districts) have ordinances and codes which require consideration during design. For example, zoning ordinances can have a substantial effect on the design of a highway and future drainage from an area. On occasion, a question may arise as to whether the State must comply with local ordinances. Generally, the State is not legally required to comply with local ordinances except where compliance is required by specific State statute. Quite often, however, the State may act in conformance with local ordinances as a matter of courtesy when it can be done without imposing a burden (cost) on the State. There are instances where the presence of an Executive Order from the Governor or by an Intergovernmental Agreement the State is to comply with local ordinances.

## 2.7.2 Special Matters

Irrigation Ditches - In situations in which an irrigation ditch intersects a drainage basin, the irrigation ditch does not have to take underground waters diverted by a tile-drain. However, the surface drainage must be accepted if the irrigation ditch is constructed in a way into which surface water would naturally flow.

# 2.8 Role Of The Designer

## 2.8.1 Responsibility

The designer has a two-fold responsibility for the legal aspects of highway drainage. First, the designer should know the legal principles involved and apply this knowledge to his designs; and, secondly, he should, as necessary, work closely with the legal staff of his organization in the preparation and trial of drainage cases. The duties of the designer include direct legal involvement in the following areas:

- conduct investigations, advise and provide expert testimony on the technical aspects of drainage claims involving existing highways; and
- provide drainage design information during right-of-way acquisition to assist appraisers in evaluating damages and provide testimony in subsequent condemnation proceedings, when necessary.

# 2.8 Role Of The Designer (continued)

## 2.8.2 Investigating Complaints

It is imperative that drainage complaints be dealt with promptly and in an unbiased manner. This means accepting the fact that the flooding is a serious problem for the complainer, and not accepting anyone's preconceived conclusions. All facts must be assembled and analyzed before deciding on what happened and why it happened. Also, it is well to list any other agency that could possibly have responsibility for a remedy to the flooding.

When the designer is requested to investigate a complaint, the following guidelines are recommended:

**Step 1 Determine Facts About The Complaint**

- Show on a map the location of the problem on which the complaint is based.
- Clearly determine the basis for the complaint (what was flooded, complainer's opinion as to what caused the flooding, description of the alleged damages, dates, times and durations of flooding).
- Briefly relate the history of any other grievances that were expressed prior to the claim presently being investigated.
- Obtain approximate dates that the damaged property and/or improvements were acquired by those claiming damages.
- Collect facts about the specific flood event(s) involved.

  Obtain rainfall data (dates, amounts, time periods and locations of gages). Rainfall data are often helpful regardless of the source.

  Document observed highwater information at or in the vicinity of the claim. Locate highwater marks on a map and specify datum. Always try to obtain highwater marks both upstream and downstream of the highway and the time the elevations occurred.

  Determine the duration of flooding at the site of alleged damage. Determine the direction of flood flow at the damaged site. Describe the condition of the stream before, after, and during flood(s). Was the growth in the channel light, medium, heavy; were there drift jams; does the stream carry much drift in flood stage; was the flow fast or sluggish; did light, moderate, or severe erosion occur?

  Document the flood history at the site. Was the highway overtopped by the flood? If so, what was the depth of overtopping; and, if possible, estimate a flow velocity across the highway. Obtain narratives of any eyewitnesses to the flooding. Obtain facts about the flood(s) from sources outside the Department, such as newspaper accounts, witnesses, measurements by other agencies (USGS, Corps of Engineers, SCS and individuals), maps and Weather Bureau rainfall records.

# 2.8 Role Of The Designer (continued)

## 2.8.2 Investigating Complaints (continued)

### Step 1 Determine Facts About The Complaint (continued)

- State facts about the highway crossing involved.

  Show profile of the highway across the stream valley. Give the date of the original highway construction and dates of all subsequent alterations to the highway, and describe what the alterations were. Describe what existed prior to the highway, such as county road, city street, or abandoned railroad embankment, etc. Also include a description of the drainage facilities and drainage patterns that were there prior to the highway. Give a description of the existing drainage facilities. Give the original drainage design criteria, or give capacity and frequency of the existing facility based upon current criteria.

- List possible effects by others.

  Are there any other stream crossings in the vicinity of the damaged site that could have affected the flooding (pipelines, highways, streets, railroads, dams)? Have there been any significant man-made changes to the stream or watershed that might affect the flooding?

### Step 2 Analyze The Facts

From the facts decide what should be done to relieve the problem regardless of who has responsibility for the remedy. Could others possibly provide assistance?

### Step 3 Make Conclusions And Recommendations

- What were the contributing factors leading to the alleged flood damage?

- Specify feasible remedies. (This should be done without any regard for who has responsibility to affect a remedy.)

The list under Determine Facts About The Complaint is not all-inclusive, nor is it intended that the entire list will be applied in each case. This outline is given as a guide to the type and scope of information desired from an investigation of a drainage complaint. It is advantageous to have available hydraulic design documentation as outlined in the Documentation Chapter of this manual. When the report is completed, the designer should again analyze the facts, consider the conclusions and recommendations and prepare a response to the complainer explaining the results of the investigation. Documentation of the facts and findings is important in the event there is future action.

## 2.8.3 As A Witness

The designer should accept the responsibility of providing expert testimony in highway drainage litigation. Witness duty ordinarily requires considerably more time of a witness than the time spent in the courtroom. The best use of the designer's time can be arranged by consulting with legal counsel to determine what types of information and data will be needed, types of presentation needed and when testimony will be required.

## 2.8 Role Of The Designer (continued)

### 2.8.3 As A Witness (continued)

Testimony often involves presenting technical facts in layman's language so that it will be clearly understood by those in the courtroom. The designer's testimony generally describes the highway drainage system involved in the alleged injury or damage, and how that system affects the complainant. Design considerations and evidence of conditions existing prior to construction of the highway are important points.

The designer who is to serve as a witness should bear one fact in mind; the purpose of the court is to administer justice. Testimony should have one purpose -- to bring out all known facts relevant to the case so that justice can better be served. Following are some pointers in being a witness:

- Do not be apprehensive. Your purpose is to present the facts as you know them and that is all that will be expected.
- Tell the truth and do not try to color, shade or change your testimony to help either side.
- Do not try to memorize your story. There is no more certain way to cross yourself than to memorize your story and try to fit this story with the questions being asked.
- Work with your lawyer in preparing your testimony and stick to the facts as you know them.
- Stick to the facts and what you personally know.
- Do not be afraid of lawyers and give your information honestly.
- Speak clear and loud enough to be heard by everyone involved in the courtroom proceeding.
- Answer all questions directly and never volunteer information the question does not ask for.
- If you do not understand a question, ask that it be explained. If you still do not understand what is being asked, explain that you cannot give an answer to that question.
- Remember that some questions do not have to be answered with a yes or no.
- If you do not know the answer to a question, just admit it. It is to your credit to be honest, rather than try to have an answer for everything that is asked you.
- Never lose your temper or show prejudice in favor of one side that is not supported by facts.

## 2.9 References

American Association of State Highway and Transportation Officials. Highway Drainage Guidelines, Chapter V — The Legal Aspects of Highway Drainage. 1982.

Federal Emergency Management Agency. National Flood Insurance Program and Related Regulations. 1987.

U.S. Army Corps of Engineers. Handbook of How to Compute a Floodway. 1987. (Copies of this publication can be obtained from — FEMA Region V, 175 West Jackson Blvd., Fourth Flood, Chicago Illinois 60604.)

# Appendix A- Federal Policies

## A.1 Introduction

The following section lists the Federal legislation which contains the Federal policies which might affect drainage design and construction. This section gives the legislative reference, regulations reference, purpose, applicability, general procedures and agency for coordination and consultation. For more detailed information about specific Federal policies, the applicable legislation should be consulted. Note: Abbreviations are given at the end of this section.

## A.2 Environmental

1. National Environmental Policy Act: 42 U.S.C. 4321-4347 (P.L. 91-190 and 94-81). Reference - 23 CFR 770-772, 40 CFR 1500-1508, CEQ Regulations, Executive Order 11514 as amended by Executive Order 11991 on NEPA responsibilities.
   Purpose - consider environmental factors through systematic interdisciplinary approach before committing to a course of action.
   Applicability - all highway projects.
   General Procedures - Procedures set forth in CEQ regulations and 23 CFR 771.
   Coordination - appropriate Federal, State, and local agencies.

## A.3 Land And Water Usage

These requirements are contained in 23 CFR 771 (FHPM 7-7-1).

**1. Executive Order 11990, Protection of Wetlands, DOT Order 5660.1A, 23 CFR 777.**
Purpose - to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative.
Applicability - federally undertaken, financed, or assisted construction, and improvements in or with significant impacts on wetlands.
General Procedures - evaluate and mitigate impacts on wetlands. Specific finding required in final environmental document.
Coordination - DOI (FWS), EPA, USCE, NMFS, NRCS, State agencies.

Executive Order 11990, May 24, 1977, orders each Federal agency to:

- take action to minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values to wetlands;
- avoid undertaking or providing assistance for new construction in wetlands unless the head of the agency finds that there is no practicable alternative and all practicable measures are taken to minimize harm which may result from the action; and
- to consider factors relevant to the proposal's effects on the survival and quality of the wetlands.

# Appendix A- Federal Policies

## A.3 Land And Water Usage (continued)

2. **Emergency Wetlands Resources Act of 1986: 16 U.S.C. - 3901 note (P.L. 99-645).**
   Purpose - to promote the conservation of wetlands in the U. S. in order to maintain the public benefits they provide.
   Applicability - all projects which may impact wetlands.
   General Procedures - (1) preparation of a National Wetlands Priority Conservation Plan which provides priority with respect to Federal and State acquisition, (2) provides direction for the National Wetlands Inventory Project.
   Coordination - FWS.

3. **Federal Water Pollution Control Act (1972), as amended by the Clean Water Act (1977 & 1987): 33 U.S.C. 1251-1376 (P.L. 92-500, 95-217, 100-4), DOT Order 5660.1A, FHWA Notices N5000.3 and N5000.4, FHPM 6-7-3-3, 23 CFR 650, Subpart B, E, 771, 33 CFR 209, 40 CFR 120, 122-125, 128-131, 133, 125-136, 148, 230-231.**
   Purpose - restore and maintain chemical, physical, and biological integrity of the Nation's waters through prevention, reduction, and elimination of pollution.
   Applicability - any discharge of a pollutant into waters of the U.S.
   General Procedures - (1) obtain permit for dredge or fill material from USCE or State agency, as appropriate (Section 404), (2) permits for all other discharges are to be acquired from EPA or appropriate State agency (Section 402), (3) water quality certification is required from State water resource agency (Section 401), (4) all projects shall be consistent with the State nonpoint source pollution management program (Section 319).
   Coordination - USCE, EPA, designated State water quality control agency, designated State non-point source pollution agency.

4. **Executive Order 11988, Floodplain Management, as amended by Executive Order 12148, DOT Order 5650.2, FHPM 6-7-3-2, 23 CFR 650, Subpart A, 771.**
   Purpose - to avoid the long- and short-term adverse impacts associated with the occupancy and modification of floodplains, and to restore and preserve the natural and beneficial values served by floodplains.
   Applicability - all construction of Federal or federally aided buildings, structures, roads, or facilities which encroach upon or affect the base floodplain.
   General Procedures - (1) assessment of flood hazards, (2) specific finding required in final environmental document.
   Coordination - FEMA, State and local agencies.

   Executive Order 11988, May 24, 1977, requires each Federal agency, in carrying out its activities, to take the following actions:

   - to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare and to restore and preserve the natural and beneficial values served by floodplains; and
   - to evaluate the potential effect of any actions it may take in a floodplain, to ensure its planning programs reflect consideration of flood hazards and floodplain management.

# Appendix A- Federal Policies

## A.3 Land And Water Usage (continued)

**4. Executive Order 11988, Floodplain Management, (continued)**
These requirements are contained in the Federal-Aid Highway Program Manual (FHPM), Volume 6, Chapter 7, Section 3, Subsection 2, and were published in the Federal Register, April 26, 1979 (44 FR 24678), and in 23 CFR 650, Subpart A.

**5. Endangered Species Act of 1973, as amended: 16 U.S.C. 1531-1543 (P.L. 93-205, 94-359, 95-632, 96-159, 97-304), 7 CFR 355, 50 CFR 17, 23, 25-29, 81, 217, 222, 225-227, 402, 424, 450-453.**
Purpose - conserve species of fish, wildlife and plants facing extinction.
Applicability - any action that is likely to jeopardize continued existence of such endangered/threatened species or result in destruction or modification of critical habitat.
General Procedures - consult with the Secretary of the Interior or Commerce, as appropriate.
Coordination - DOI (FWS), Commerce (NMFS).

6. **Fish and Wildlife Coordination Act: 16 U.S.C. 661-666c (P.L. 85-624, 89-72, 95-616).**
Purpose - conservation, maintenance, and management of wildlife resources.
Applicability - (1) any project which involves impoundment (surface area of 4.05 hectares or more), diversion, channel deepening, or other modification of a stream or other body of water, (2) transfer of property by Federal agencies to State agencies for wildlife conservation purpose.
General Procedures - coordinate early in project development with FWS and State fish and wildlife agency.
Coordination - DOI (FWS), State fish and wildlife agencies.

# Appendix A- Federal Policies

## A.4 Abbreviations

Following are the abbreviations used in the above descriptions of Federal policies.

BIA - Bureau of Indian Affairs
BLM - Bureau of Land Management
CEQ - Council on Environmental Quality
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
CFR - Code of Federal Regulations
DOA - Department of the Army
DOD - Department of Defense
DOI - Department of the Interior
DOT - Department of Transportation
EPA - Environmental Protection Agency
FEMA - Federal Emergency Management Agency
FHPM - Federal-Aid Highway Program Manual
FHWA - Federal Highway Administration
FIFRA - Federal Insecticide, Fungicide, and Rodenticide Act
FWPCA - Federal Water Pollution Control Act
FWS - Fish and Wildlife Service
HUD - Housing and Urban Development
NMFS - National Marine Fisheries Service
NPS - National Park Service
NRCS - National Resource Conservation Service; formerly Soil Conservation Service (SCS)
OCZM - Office of Coastal Zone Management
P.L. - Public Law
RCRA - Resource Conservation and Recovery Act
SARA - Superfund Amendments and Reauthorization Act
SEE - Social, Economic, and Environmental
SIP - State Implementation Plan
Stat. - Statute
TVA - Tennessee Valley Authority
UMTA - Urban Mass Transportation Administration
U.S.C. - United States Code
USCE - U.S. Corps of Engineers
USCG - U.S. Coast Guard
USFS - U.S. Forest Service

# Appendix B Federal Emergency Management Agency (FEMA)

## B.1 National Flood Insurance Program

The Flood Disaster Protection Act of 1973 (Pl 93-234, 87 Stat. 975) denies Federal financial assistance to flood prone communities that fail to qualify for flood insurance. Formula grants to States are excluded from the definition of financial assistance, and the definition of construction in the Act does not include highway construction; therefore, Federal aid for highways is not affected by the Act. The Act does require communities to adopt certain land use controls in order to qualify for flood insurance. These land use requirements could impose restrictions on the construction of highways in floodplains and floodways in communities that have qualified for flood insurance. A floodway, as used here and as used in connection with the National Flood Insurance Program, is that portion of the floodplain required to pass a flood that has a 1-percent chance of occurring in any 1-year period without cumulatively increasing the water surface elevation more than 1 ft (0.3 m).

## B.2 Flood Insurance

The National Flood Insurance Act of 1968, as amended, (42 U.S.C. 4001-4127) requires that communities adopt adequate land use and control measures to qualify for insurance. Federal criteria promulgated to implement this provision contain the following requirements that can affect certain highways.

In riverine situations, when the Administrator of the Federal Insurance Administration has identified the flood prone area, the community must require that, until a floodway has been designated, no use, including land fill, be permitted within the floodplain area having special flood hazards for which base flood elevations have been provided, unless it is demonstrated that the cumulative effect of the proposed use, when combined with all other existing and reasonably anticipated uses of a similar nature, will not increase the water surface elevation of the 100-year flood more than 1 ft (0.3 m) at any point within the community.

- After the floodplain area having special flood hazards has been identified and the water surface elevation for the 100-year flood and floodway data have been provided, the community must designate a floodway which will convey the 100-year flood without increasing the water surface elevation of the flood more than 1 ft (0.3 m) at any point and prohibit, within the designated floodway, fill, encroachments and new construction and substantial improvements of existing structures which would result in any increase in flood heights within the community during the occurrence of the 100-year flood discharge.

- The participating cities and/or counties agree to regulate new development in the designated floodplain and floodway through regulations adopted in a floodplain ordinance. The ordinance requires that development in the designated floodplain be consistent with the intent, standards and criteria set by the National Flood Insurance Program.

# Appendix B Federal Emergency Management Agency (FEMA)

## B.3 Local Community

The local community with land use jurisdiction, whether it is a city, county, or State, has the responsibility for enforcing National Flood Insurance Program (NFIP) regulations in that community if the community is participating in the NFIP. Consistency with NFIP standards is a requirement for Federal-aid highway actions involving regulatory floodways. The community, by necessity, is the one who must submit proposals to Federal Emergency Management Agency (FEMA) for amendments to NFIP ordinances and maps in that community should it be necessary. The highway agency should deal directly with the community and, through them, deal with FEMA. Determination of the status of a community's participation in the NFIP and review of applicable NFIP maps and ordinances are, therefore, essential first steps in conducting location hydraulic studies and preparing environmental documents.

## B.4 NFIP Maps

Where NFIP maps are available, their use is mandatory in determining whether a highway location alternative will include an encroachment on the base floodplain. Three types of NFIP maps are published:

- Flood Hazard Boundary Map (FHBM),
- Flood Boundary and Floodway Map (FBFM), and
- Flood Insurance Rate Map (FIRM).

A FHBM is generally not based on a detailed hydraulic study and, therefore, the floodplain boundaries shown are approximate. A FBFM, on the other hand, is generally derived from a detailed hydraulic study and should provide reasonably accurate information. The hydraulic data from which the FBFM was derived are available through the regional office of FEMA. This is normally in the form of computer input data records for calculating water surface profiles. The FIRM is generally produced at the same time using the same hydraulic model and has appropriate rate zones and base flood elevations added.

Communities may or may not have published one or more of the above maps depending on their level of participation in the NFIP. Information on community participation in the NFIP is provided in the "National Flood Insurance Program Community Status Book" which is published semiannually for each State.

## B.5 Coordination With FEMA

It is intended that there will be coordination with local Flood Plain Administrator in situations where administrative determinations are needed involving a regulatory floodway or where flood risks in NFIP communities are significantly impacted. The circumstances which would ordinarily require coordination with local Floodplain Administrator include the following:

- When a proposed crossing encroaches on a regulatory floodway and, as such, would require an amendment to the floodway map.
- When a proposed crossing encroaches on a floodplain where a detailed study has been performed but no floodway designated and the maximum 1-ft (0.3-m) increase in the base flood elevation would be exceeded.

# Appendix B Federal Emergency Management Agency (FEMA)

## B.5 Coordination With FEMA (continued)

- When a local community is expected to enter into the regular program within a reasonable period and detailed floodplain studies are under way.
- When a local community is participating in the emergency program and base FEMA flood elevation in the vicinity of insurable buildings is increased by more than 1-ft (0.3-m). Where insurable buildings are not affected, it is sufficient to notify FEMA of changes to base flood elevations as a result of highway construction.

The draft Environmental Impact Statement or Environmental Assessment (EIS/EA) should indicate the NFIP status of affected communities, the encroachments anticipated and the need for floodway or floodplain ordinance amendments. Coordination means furnishing to FEMA the draft EIS/EA and, upon selection of an alternative, furnishing to FEMA, through the community, a preliminary site plan and water surface elevation information and technical data in support of a floodway revision request as required. If a determination by FEMA would influence the selection of an alternative, a commitment from FEMA should be obtained prior to the final environmental impact statement (FEIS) or a finding of no significant impact (FONSI). Otherwise this later coordination may be postponed until the design phase.

## B.6 Consistent With Floodways

In many situations it is possible to design and construct highways in a cost-effective manner such that their components are excluded from the floodway. This is the simplest way to be consistent with the standards and should be the initial alternative evaluated. If a project element encroaches on the floodway but has a very minor effect on the floodway water surface elevation (such as piers in the floodway), the project may normally be considered as being consistent with the standards, if hydraulic conditions can be improved so that no water surface elevation increase is reflected in the computer printout for the new conditions.

## B.7 Revisions Of Floodway

Where it is not cost-effective to design a highway crossing to avoid encroachment on an established floodway, a second alternative would be a modification of the floodway itself. Often, the community will be willing to accept an alternative floodway configuration to accommodate a proposed crossing provided NFIP limitations on increases in the base flood elevation are not exceeded. This approach is useful where the highway crossing does not cause more than a 1-ft (0.3-m) rise in the base flood elevation. In some cases, it may be possible to enlarge the floodway or otherwise increase conveyance in the floodway above and below the crossing in order to allow greater encroachment. Such planning is best accomplished when the floodway is first established. However, where the community is willing to amend an established floodway to support this option, the floodway may be revised.

The responsibility for demonstrating that an alternative floodway configuration meets NFIP requirements rests with the community. However, this responsibility may be borne by the agency proposing to construct the highway crossing. Floodway revisions must be based on the hydraulic model which was used to develop the currently effective floodway but updated to reflect existing encroachment conditions. This will allow determination of the increase in the base flood elevation that has been caused by encroachments since the original floodway was established. Alternate floodway configurations may then be analyzed.

# Appendix B Federal Emergency Management Agency (FEMA)

## B.7 Revisions Of Floodway (continued)

Base flood elevations increases are referenced to the profile obtained for existing conditions when the floodway was first established.

## B.8 Data For Revisions

Data submitted to FEMA, through the community, in support of a floodway revision request should include the following.

- Copy of current regulatory Flood Boundary Floodway Map, showing existing conditions, proposed highway crossing and revised floodway limits.
- Copy of computer printouts (input, computation and output) for the current 100-year model and current 100-year floodway model.
- Copy of computer printouts (input, computation and output) for the revised 100-year floodway model. Any fill or development that has occurred in the existing flood fringe area must be incorporated into the revised 100-year floodway model.
- Copy of engineering certification is required for work performed by private subcontractors.

The revised and current computer data required above should extend far enough upstream and downstream of the floodway revision area in order to tie back into the original floodway and profiles using sound hydraulic engineering practices. This distance will vary depending on the magnitude of the requested floodway revision and the hydraulic characteristics of the stream.

If input data representing the original hydraulic model are unavailable, an approximation should be developed. A new model should be established using the original cross section topographic information, where possible, and the discharges contained in the Flood Insurance Study that established the original floodway. The model should then be run confining the effective flow area to the currently established floodway and calibrate to reproduce within 0.10 ft the "With Floodway" elevations provided in the Floodway Data Table for the current floodway. Floodway revisions may then be evaluated using the procedures outlined above.

## B.9 Allowable Floodway Encroachment

When it would be demonstrably inappropriate to design a highway crossing to avoid encroachment on the floodway and where the floodway cannot be modified such that the structure could be excluded, FEMA will approve an alternate floodway with backwater in excess of the 1-ft maximum only when the following conditions have been met:

- A location hydraulic study has been performed in accordance with Federal-Aid Highway Program Manual (FHPM) 6-7-3-2, FHWA, "Location and Hydraulic Design of Encroachments on Flood-plains" (23 CFR 650, Subpart A) and FHWA finds the encroachment is the only practicable alternative.
- The constructing agency has made appropriate arrangements with affected property owners and the community to obtain flooding easements or otherwise compensate them for future flood losses due to the effects of backwater greater than 1 ft.

# Appendix B Federal Emergency Management Agency (FEMA)

## B.9 Allowable Floodway Encroachment (continued)

- The constructing agency has made appropriate arrangements to assure that the National Flood Insurance Program and Flood Insurance Fund will not incur any liability for additional future flood losses to existing structures which are insured under the Program and grandfathered in under the risk status existing prior to the construction of the structure.
- Prior to initiating construction, the constructing agency provides FEMA with revised flood profiles, floodway and floodplain mapping and background technical data necessary for FEMA to issue revised Flood Insurance Rate Maps and Flood Boundary and Floodway Maps for the affected area, upon completion of the structure.

Highway Encroachment On A Floodplain With A Detailed Study (FIRM)

In communities where a detailed flood insurance study has been performed but no regulatory floodway designated, the highway crossing should be designed to allow no more than 1-ft increase in the base flood elevation based on technical data from the flood insurance study. Technical data supporting the increased flood elevation shall be submitted to the local community and through them to FEMA for their files.

Highway Encroachment On A Floodplain Indicated On An FHBM

In communities where detailed flood insurance studies have not been performed, the highway agency must generate its own technical data to determine the base floodplain elevation and design encroachments in accordance with FHPM 6-7-3-2. Base floodplain elevations shall be furnished to the community, and coordination carried out with FEMA as outlined previously where the increase in base flood elevations in the vicinity of insurable buildings exceeds 1 ft.

Highway Encroachment on Unidentified Floodplains

Encroachments that are outside of NFIP communities or NFIP identified flood hazard areas should be designed in accordance with FHPM 6-7-3-2 of the Federal Highway Administration.

## B.10 Levee Systems

For purposes of the National Flood Insurance Program (NFIP), FEMA will only recognize in its flood hazard and risk mapping effort those levee systems that meet, and continue to meet, minimum design operation, and maintenance standards that are consistent with the level of protection sought through the comprehensive floodplain management criteria as outlined in the NFIP. The levee system must provide adequate protection from the base flood. Information supporting this must be supplied to FEMA by the community or other party seeking recognition of such a levee system at the time a flood risk study or restudy is conducted, when a map revision is sought based on a levee system, and upon request by the Administrator during the review of previously recognized structures. The FEMA review will be for the sole purpose of establishing appropriate risk zone determinations for NFIP maps and shall not constitute a determination by FEMA as to how a structure or system will perform in a flood event. For more information on the requirements related to levee systems see "National Flood Insurance Program and Related Regulations", Federal Emergency Management Agency, Revised October 1, 1986 and Amended June 30, 1987 (44 CFR 65.10).